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**REMARKS****Rejection of Claims and Traversal Thereof**

In the October 6, 2006 Office Action,

claims 1-7, 10 and 12-22 were rejected under 35 USC §103(a) as being unpatentable over Mouliney (U.S. Patent No. 5,745,835) in view of Wei, et al. (Separation of actinides from simulated spent fuel solutions by an advanced ion-exchange process, *Journal of Alloy and Compounds*, 271-273, pp 693-699 (1998)); and

claims 1-9 and 11-22 were rejected under 35 USC §103(a) as being unpatentable over Mouliney in view of Yoneya (U.S. Patent No. 5,437,847).

These rejections are hereby traversed and reconsideration of the patentability of the pending claims is therefore requested in light of the following remarks.

**Rejection under 35 USC §103**

Claims 1-7, 10 and 12-22 were rejected under 35 USC §103(a) as being unpatentable over Mouliney (U.S. Patent No. 5,745,835) in view of Wei, et al. Applicants respectfully traverse this rejection and submit that Mouliney in combination with Wei, et al. does not render Applicants' claimed invention as *prima facie* obvious.

The presently claimed invention relates to an improved method for dissolving actinic oxides for the removal of plutonium and uranium by dissolving the actinic oxides into a solution of nitric acid and then treating this acidic solution to firstly removing palladium. Applicants found that this initial removal of palladium increases the recovery of plutonium.

According to the Office, Mouliney describes a process and system for dissolving actinic oxides in a solution of nitric acid and the treatment of said nitric acid containing dissolved actinic oxides with divalent silver. However, the Office realizes that the Mouliney patent never addresses the issue of palladium or the removal of palladium from the solution and to remedy this shortcoming has introduced the teachings of Wei, et al.

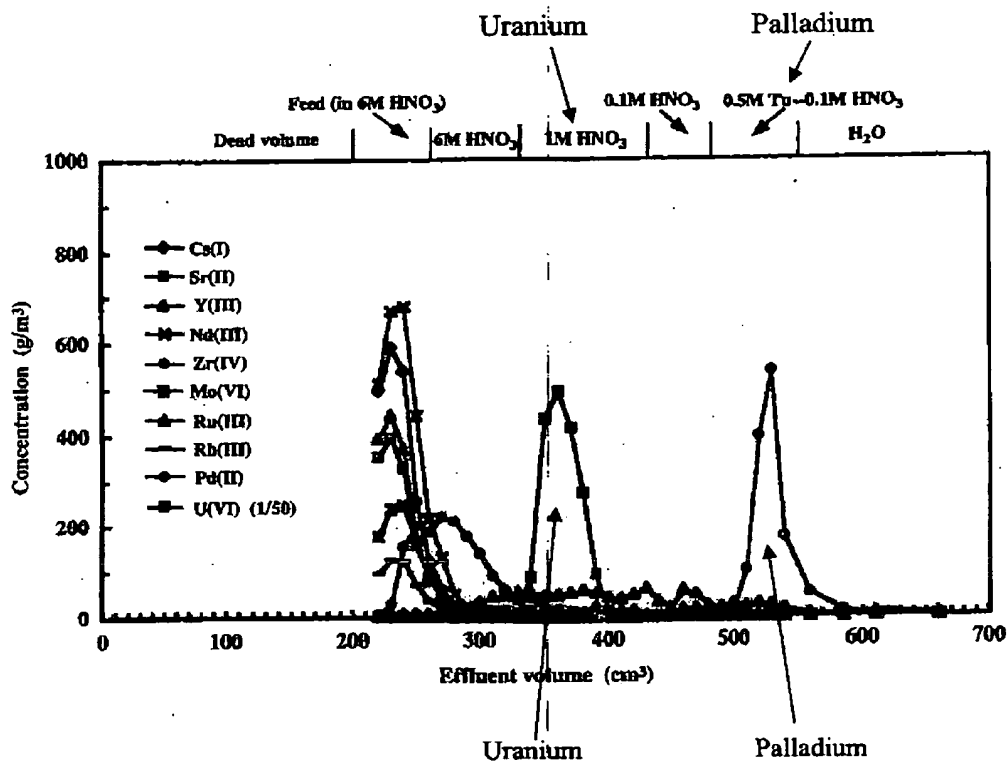
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The Office states that:

"Accordingly, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the disclosure of the Mouliney patent with the teachings of the Wei reference because the Wei reference teaches the separation of palladium from the nitric solution containing dissolved actinic oxides by ion exchange. To repeat the separation and treatment with silver would have been an obvious modification, because such repetition would produce a further purified solution and separation."

Applicants vigorously disagree because the addition of Wei does not in any way teach or suggest the presently claimed invention. Notably, only one of the Wei solutions (solution A) even includes palladium and importantly this solution does not include plutonium. More importantly, the palladium is not even removed until after the uranium has been removed as can be seen in Figure 2 from Wei and recreated below.



Wei, expressly states on page 694, first column that:

"the simulated spent fuel solution was fed into the column at a constant flow rate of 3.8 or 9.0 ml/h. Then the eluent solution, i.e. HNO₃, U(IV)-N₂H₄ (reductive eluent for

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Pu(IV)) and thiourea (Tu,  $\text{H}_2\text{NCSH}_2$ ), were applied to the column successively. The effluents from the column were recovered by fractional collection with a volume of 6-15  $\text{cm}^3$ ."

Notably, the thiourea was not added until the very end of the cycle of additions as shown above in Figure 2. This is important information because the reference expressly states on page 695, first column, that Pd(II) was strongly adsorbed by the anion-exchanges and was effectively eluted by the thiourea solution. Notably, the Pd was not removed from the system until after the Uranium was eluted. The only solution in Wei that includes plutonium (Solution C) has no palladium included, and as such, how could one skilled in the art recognize the importance of removing palladium to more effectively remove plutonium. Clearly, this proposed combination of Mouliney and Wei does not teach the removal of palladium before the uranium and/or plutonium.

It is incumbent on the Office to view applicants' claimed invention as a whole. *In re Wesslau*, 174 U.S.P.Q. 393 (CCPA 1965). Concurrently, the Office must consider the inventions of any cited references in their respective entireties. Certain individual features from the references may not be arbitrarily chosen (while equally arbitrarily discarding other disclosed features) to merely lump together disparate features of different references as a mosaic in an attempt to meet the features of the rejected claims. Thus, the Office is not allowed to pick and choose just certain parts of different references and combine them, but instead, the references in their entirety must be considered. As such, the Office must recognize that Wei teaches the removal of palladium only after uranium has been removed from the system. The Office seems to be merely reinterpreting the prior art in light of applicants' disclosure, in order to reconstruct applicants' claimed invention, but without any instructional or motivating basis in the references themselves. Such approach is improper and legally insufficient to establish any *prima facie* case of obviousness.

The Office proposes that the two references can be combined to teach and suggest applicants' claimed invention. However, even if the two references were attempted to be combined (despite the absence of any proper basis for such combination), the resultant combination would still not embody every limitation required by applicants' claimed invention. Specifically, the combination would still not disclose, teach or suggest removing palladium before the removal of uranium or plutonium. Further, neither of the references recognizes the advantages of initially removing the palladium from the solutions to enhance the dissolution of plutonium.

In light of the above discussion and the fact that (1) there is no motivation, suggestion or teaching to combine the references; and (2) each and every recited limitation of applicants' claimed invention are not

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disclosed or suggested in the cited references, it is clear that the cited combination fails to establish a *prima facie* case of obviousness of applicants' claims as herein amended.

Claims 1-9 and 11-22 were rejected under 35 USC §103(a) as being unpatentable over Mouliney in view of Yoneya (U.S. Patent No. 5,437,847). Again, applicants submit that this proposed combination does not render the presently claimed invention unpatentable.

As stated above, Mouliney does not teach or suggest the removal of palladium before the removal of plutonium or uranium. However, the Office speculates that:

"the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the disclosure of the Mouliney patent with the teachings of the Yoneya patent because the Yoneya patent teaches the separation of palladium from the nitric solutions containing dissolved actinic oxide."

Applicants insist that the Office must view the Yoneya reference in its entirety and recognize that the Yoneya does not teach or suggest the removal of palladium before the removal of plutonium or uranium. The Yoneya reference is related to the removal of Ruthenium from **high-level radioactive liquid waste**, and the reference teaches the initial removal of palladium from this **high-level radioactive liquid waste**. As stated by Yoneya, in column 1, lines 15-20,

"the reprocessing step of spent nuclear fuel by purex process, there is utilized a method wherein uranium and plutonium are extracted with a solvent from a solution of spent fuel in nitric acid and leaving radioactive fission products in the solution of nitric acid. The solution of fission products in nitric acid is referred to as high-level radioactive liquid waste."

Notably, the Toneya invention relates to the removal of palladium from the **high-level radioactive liquid waste from which the uranium and plutonium have already been removed**. This is a very important and subtle distinction that must be recognized by the Office. Toneya does not teach the removal of palladium from the spent nuclear fuel that contains uranium and plutonium but only teaches the removal of palladium from the **high-level radioactive liquid waste after the removal of plutonium**.

One skilled in the art would know that all commercial reprocessing plants use the well-proven hydrometallurgical PUREX (Plutonium Uranium EXtraction) process. This involves dissolving the fuel elements in concentrated nitric acid. Chemical separation of uranium and plutonium is then undertaken by solvent extraction steps. The remaining liquid, after Pu and U are removed, is termed as "**high-level waste**" which contains fission products and minor actinides (Np, Am, Cm). This high level waste is

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highly radioactive and continues to generate a lot of heat. It can be conditioned by calcining and incorporation of the dry material into borosilicate glass, then stored pending disposal. The high level waste discussed herein above is the same as the high level waste discussed by Yoneya.

One skilled in the art would never consider that the Toneya reference adds anything to the Mouliney reference, and clearly, a skilled artisan would never consider that the proposed combination teaches or suggest the removal of palladium before the removal of plutonium. Further, applicants submit that the Office has not provided objective or specific teachings or suggestions in any of the cited references to combine or modify them to go in the direction of applicants' claimed invention. Wherein is there any motivation in Toneya, to remove palladium from the spent nuclear fuel? There is none because palladium is only removed from the high level waste material generated after the removal of plutonium and/or uranium. Thus, the Office has not established or proven a *prima facie* case of obviousness. Applicants therefore request that the rejection of claims 1-9 and 11-22 on the basis of obviousness, be withdrawn.

#### Conclusion

Applicants have satisfied the requirements for patentability. All pending claims are free of the art and fully comply with the requirements of 35 U.S.C. §112. It therefore is requested that Examiner Phasge reconsider the patentability of claims 1-22 in light of the distinguishing remarks herein, and withdraw all rejections, thereby placing the application in condition for allowance. Notice of the same is earnestly solicited. In the event that any issues remain, Examiner Phasge is requested to contact the undersigned attorney at (919) 286-8089 to resolve same.

Respectfully submitted,



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